



Intensive Care Units (ICU) Telemedicine Reduces Inter-Hospital ICU Transfers in the Veterans Health Administration

BACKGROUND

Small, rural VA hospitals typically have lower resourced ICUs compared to those in urban VA hospitals with limited access to subspecialists, pharmacy, laboratory services, and diagnostic and procedural services.¹ In addition, there is a chronic shortage of intensivist—critical care trained physician specialists—in the United States.² ICU telemedicine is one strategy to provide critical care support to hospitals that lack resources and adequate intensivist staffing. The Veterans Health Administration (VHA) has implemented ICU telemedicine in several hospitals, in part, to fill this gap.^{3,4} Studies have shown the effect of telemedicine on ICU mortality is small,^{3,5-7} but ICU telemedicine may reduce transfers from regional hospitals to larger facilities. Our study objective was to examine the association of ICU telemedicine with inter-hospital transfers of ICU patients to other acute care facilities.

Analyzing VHA data, we compared the proportion of ICU patients who transferred to another acute care facility among hospitals affiliated with an ICU telemedicine program with hospitals with no ICU telemedicine program.

FINDINGS

- Inter-hospital transfers decreased by 1.47% (from 3.46% to 1.99%) after telemedicine implementation in ICU telemedicine hospitals compared with 0.34% in the non-telemedicine hospitals ($p < 0.001$).
- In adjusted analysis, the overall relative risk (RR) of ICU transfers among ICU telemedicine facilities was reduced to 0.79 (95% confidence interval [95%CI]=0.71-0.87, $p < 0.001$).
- ICU telemedicine was associated with a reduction in transfers in patients with gastrointestinal (RR=0.55; 95% CI=0.41-0.74, $p < 0.001$) and respiratory admission diagnoses (RR=0.52; 95% CI=0.38-0.71, $p < 0.001$).
- Telemedicine was associated with a transfer decrease among all illness severity quartiles except the lowest acuity quartile and in medical (RR=0.82; 95% CI=0.73-0.92, $p = 0.001$) but not in surgical patients (RR=0.77; 95% CI=0.57-1.04, $p = 0.087$).

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- ICU telemedicine reduced transfers in both low- and high-volume hospitals.
- In adjusted analysis, ICU telemedicine was associated with a transfer decrease in rural patients (RR=0.77; 95% CI=0.63-0.95, p=0.014).
- The 30-day unadjusted mortality did not change before (6.87%) and after ICU telemedicine (6.92%; p=0.78). The 30-day unadjusted mortality of transferred patients was 6% and 8.7% (p=0.001) whereas the mortality in non-transferred patients was 6.9% and 6.9% (p=0.9) before and after ICU telemedicine, respectively.

IMPLICATIONS

ICU telemedicine reduces inter-hospital transfers of critically ill patients without increasing the mortality. Reducing inter-hospital transfers may improve patient, family and staff satisfaction, while reducing the cost of transfers.

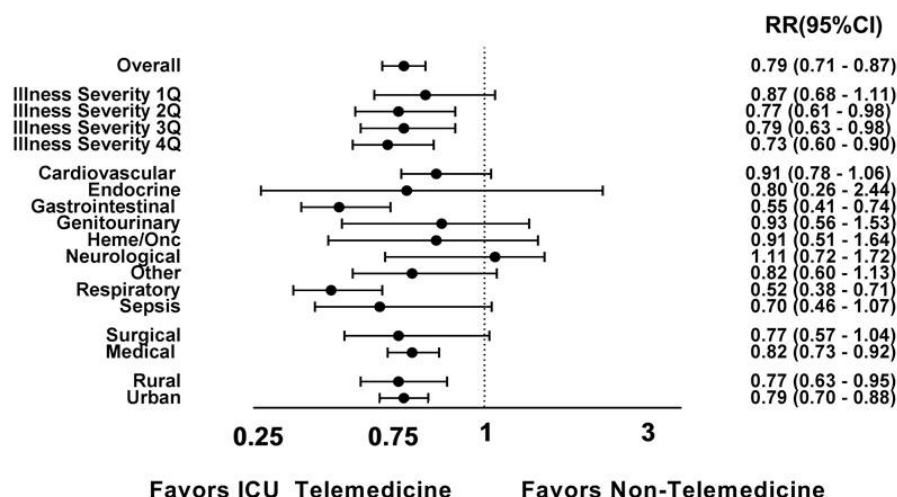


Figure shows the relative risk in inter-hospital transfers between pre-telemedicine and post-telemedicine periods for ICU telemedicine versus non-telemedicine facilities. All models were adjusted for patient demographics, illness severity, facility, category diagnosis, surgery or medical diagnosis and residence (rural or urban).

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SUBJECT MATTER EXPERTS

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